EXHIBIT E

The AdviceNet System for Automating Technical Support

Universe Communications, Inc.
2180 Dwight Way, Suite C
Berkeley CA 94704

12/10/97

Abstract

The ADVICENET system allows technical support organizations, such as software and hardware providers, Internet service providers and corporate IT departments, to support very large communities of client personal computers and their users. It allows such businesses to pro-actively avoid problems on client PC's before they arise and automatically repair problems on client PC's as they arise. It is based on novel use of Internet technologies, and novel tools to describe and query the state of PC's. It fits naturally in the existing work pattern of technical support organizations.

ADVICENET delivers *advice documents* from *advice providers* to *advice subscribers*. Advice documents describe potential problems which users may be experiencing as well as the solutions of those problems. Problems are described in a formal language which is read automatically by copies of the ADVICENET Advice Reader running on each individual computer. Advice documents typically reference an applet solving the given problem on the given machine or describing user actions which will fix the problem. The advice reader can tell if the computer it is running on is in need of any given piece of advice and when it determines there is a need, will offer the user to apply the solution automatically.

ADVICENET is an inexpensive and supremely efficient mechanism for communicating solutions of potential technical problems. An advice provider need only prepare an advice document and place it at an advice site to ensure that the problem description and recommended solution begin immediately and automatically to diffuse over the Internet to thousands or even millions of users. Many advice providers will recognize this to be an overwhelming improvement on existing methods of problem resolution/solution delivery, such as mailings or 1-800 phone support. Many technical support organizations have recently mounted massive efforts to develop knowledge bases of problems and solutions; they will find that ADVICENET allows them to effectively use that knowledge in a pro-active way.

ADVICENET is also attractive to individual users. ADVICENET solves problems on the user's computer, while rigorously avoiding unnecessary intrusions on the user's time and attention. Advice is brought to the user's attention by the ADVICENET system only when the ADVICENET reader recognizes that the user is having the indicated problem. The user need never know about the ADVICENET system until his machine has the symptoms of a recognized problem, and the user need only 'click ok' in order to fix the problem. In addition, a central feature of ADVICENET is the ability to protect the user's security and privacy.

This document describes in a broad overview the basic components of the ADVICENET system and the services and benefits they provide.

13 PAGES

Contents

1 Introduction

This document describes, in broad overview, the ADVICENET System, and the role it can play in automating technical support services. The introduction describes the extremely complex and costly world of modern PC's. Later sections develop a picture of the ADVICENET system and how it addresses the key challenges of the current situation.

1.1 Making Computers Work

There are now half a billion computers on earth; within a few years, this number will approach one billion. On any given day, tens of millions of computers crash; as a result, millions of people worldwide lose valuable time, data and money. The object we call a 'personal computer' is, despite the friendly name, a highly complex collection of interacting systems, with many software applications, hardware items, and networking protocols installed and able to interact in unforeseen ways. Certain combinations of products are troublesome; certain products work well only when certain system parameters are set appropriately, or when certain files are installed in appropriate locations. Quite innocent actions by users – moving files, changing settings, closing applications – can literally render a personal computer unusable.

The complexity of this environment is continually increasing, and this gives ever more opportunities for trouble to arise. There are now tens of thousands of hardware and software products available for use with the computer, and more are being introduced every day. As a result, it is impossible for hardware and software producers to thoroughly test all combinations of installed products, or all variations on computer parameter settings. Moreover, the problem is not necessarily 'bad programming'; the environment is so complex, that no matter how 'good' the programming is, problematic interactions will be discovered after a product is released to the public. One can expect that there will always be an unavoidable component of 'computer problems' caused by the complexity of the environment and that in sheer numbers of people affected, this number will grow ever larger as computers become more integrated into ever wider ranges of human activity.

In a strong sense, computers are more trouble-prone than other useful items in our everyday lives: by any standard, cars, photocopy machines, and other similar objects are far more reliable than computers. Yet by and large, computer support is handled in the same fashion as far simpler technologies – through 1-800 phone calls to hardware and software manufacturers, through a network of sales representatives and product dealers, and through a network of systems integration consultants.

The problem is too large and too difficult to be handled in this fashion. The usual approaches for making computers work well have not been designed to cope with the explosively growing size of the number of computers and users, or with the increasing number of potentially problematic interactions. In fact, continuing current trends, the day is coming when there will not be enough 1-800 telephone staff, nor enough dealers and systems consultants, to deal even minimally with all the support problems that will arise.

1.2 The Financial Burden

Keeping computers running is a costly business for everyone concerned. While there is no single figure that captures the full dimensions of the situation, the picture that emerges by combining many different sources is one of tremendous expense in response to the tremendous intrinsic complexity.

- *Burden on Corporate Budgets.* The Gartner Group has championed the concept of 'Total Cost of Ownership' as an important figure for management to track and respond to. It estimates that the three-year cost of owning a single personal computer in a corporate setting exceeds $44,000 [4]. The initial investment in the hardware and software used on the machine is dwarfed by other costs of ownership. Gartner estimates that 27% of the Total Cost of Ownership is due to Technical Support, which all by itself exceeds the capital cost of initially acquiring the equipment and software (only 21% of Total Cost of Ownership).

- *Burden on Moderate-Sized Businesses.* The idea of *not maintaining* IT departments and Help Desks is not really an option, even for moderate-sized businesses. According to a report by Nolan Norton and Co., businesses which operate PC's without a help desk support structure suffer costs of between $6,000 and $15,000 per year – the cost of lost productivity for employees who can't get their work done or must interrupt other workers. per PC

- *Burden on Small Businesses.* Small businesses are simply too small to have IT departments and Help Desks. Instead, support for small office computing is conducted by outside contractors, systems consultants who often spend time solving rather minor issues for customers. There is reportedly a dramatic shortage in major metropolitan areas of systems consultants who can help maintain small office computing systems, with available consultants charging fees running at $125.00/hour even for basic tasks. This cost seems particularly high when the maintenance tasks being attempted are often simple technical support issues.

- *Burden on Software Producers.* According to the Association of Support Professionals [5] the 1997 median cost of support for a medium to large software developer is 8% of revenues. This varies by type of product, with developers of high-end products spending as much as 20% of sales on support.

- *Burden on Large Software Producers.* Microsoft answers 22 million technical support calls per year. In order to keep up with the press of user queries, it has invested $500 million over the last three years to develop new Technical Support infrastructure [7].

These are just a few examples of cost reports which are publicly available. They all point to the great cost and complexity of existing tech support arrangements. This would be bad enough in a slowly changing world. But unfortunately, the world is rapidly changing, and the computational universe is rapidly expanding. The financial burden of technical suppport issues will only become worse as the number of computers continues to expand.

2 There Must be a Better Way

Much of the complexity and frustration currently experienced by millions of computer users *could be avoided.* We maintain that the frustration and complexity are caused by a *communications problem* which technology can solve.

2.1 Support is a Communications Problem

We can identify two classes of actors in the process of computer maintenenance and support:

- *Experts* - who know about many potential problems and could help users avoid or solve those problems; and
- *Users* - who need to get solutions but can't hope to easily find just the solution they need for the problem they have.

Experts, in this viewpoint, are individuals with special knowledge about specific situations and methods to fix them. They could be working for any of a large variety of organizations. Typical examples include

- *Software Providers.* Individuals in software development and in technical support who know of problems that users of their products will experience under certain conditions.
- *Hardware Providers.* Individuals in harware development and in technical support who know of problems that users of their products will experience under certain conditions.
- *Corporate IT managers.* Individuals in large organizations who know about situations special to their own corporate mission and their own mix of applications and hardware.
- *Internet Service Providers.* Internet Service Providers who need to insure that their users connect smoothly to the network and obtain access to special services they are entiteld to.
- *User Groups.* Individuals managing the sharing of large bodies of advice about the care and maintenance of specific machines/ software products/ hardware products.

In each case, the organization will know a great deal of information about problems likely to be experienced by the user population, and a great deal about how to avoid and to fix such problems. In many cases, this information is informally recorded – residing simply 'between the ears' of the experts; in other cases, it is recorded in manuals and technical reports; in still other cases it is formally documented in technical knowledge bases which the organizations have compiled patiently over years of effort.

A given user might potentially be interested in solutions provided by any or all of these types of experts, meaning that dozens or even potentially hundreds of experts in the world at large might know of important situations and corrective remedies on that given user's computer. For the user to benefit from the existing expertise, the user must communicate with any or all of these experts, share with them a description of his concerns/problems, and obtain from them solutions and partial solutions. So the problem of computer maintenance and reliability can be viewed as a communications problem.

2.2 Communications Methods Used Today

Unfortunately, existing approaches for joining the key actors together are clumsy and inefficient. They require great expenditures of time and money, often for the purposes of communicating trivial amounts of useful information.

2.2.1 1-800 Technical Support.

For problems which are so bad that the user perceives that they require immediate attention, the standard solution is for the user to call the technical support organization associated with whatever hardware or software vendor the user suspects may know the solution.

From the organization's point of view, the process has severe drawbacks

- *Costly Misdirection.* Frequently user calls are misdirected. For example, the appropriate organization for the user to contact is different than the organization he has chosen to contact. Or, the problem identified by the user may not be a problem at all, but simply a quirk or misunderstanding. Nevertheless, it can take a great deal of time for the support technician to see that a different organization should be handling the problem.

- *Costly Diagnosis.* It is frequently difficult for the technical support professional to diagnose the possible problem. He does not have direct access to information about the configuration of the machine, and often must spend a great deal of time asking elementary questions of the user in order to understand the specifics of the problem and of the PC configuration. This is particularly so when one considers that often the problem being identified is relatively straightforward ('you need a new version of the program', 'you need to correctly set your TCP/IP information'). The resulting expense is out of all proportion to the underlying amount of information being obtained.

- *Costly Delivery.* Even when the process produces a clear diagnosis of the problem, and so has clear benefits, the costs incurred – telephone and salary - may be unreasonably large. This is especially evident when one considers that often the solution to a problem is a relatively trivial one ('move such and such a file'; 'change such and such a control panel setting'; 'get this update'). The expense of solving such problems is out of all proportion to the underlying amount of intrinsic work required to solve it.

- *Costly Repetition.* As a general rule, few problems that arise are unique. Most problems which generate tech support demands are experienced by many users. *Many tech support calls are destined to be repeated a thousand times over,* as user after user experiences the same problem again and again.

The process is also inefficient for users:

- *Frustrating Waits.* There is often a very long wait on the phone line before reaching a technical support professional. At major hardware and software manufacturers today, waits of 15 minutes to half an hour are common.

- *Frustrating Searches.* A common outcome of a technical support call is the technician's instruction that the use's problem really should be handled by a different organization. This means that the user bounces around, from organization to organization, searching for a friendly ear.

- *Failure to Solve.* Often the technical support professional is not able to reach a clear identification of the problem. In other cases, the user is not able to understand or utilize the information provided by the technical support staff.

2.2.2 Printed Matter

Many problems experienced by users could be avoided if they had a complete knowledge of information already provided in various manuals and README files. However, by and large, computer manuals do not get read, and neither do README files.

Even for computer-literate professionals, it is often difficult to search through the information contained in such resources and find out what, if any, of the many messages there

might be applicable either to the user's machine, or to the user's current problem. The complexity of the problem really outstrips the linear nature of printed information.

2.2.3 Web Sites.

The most dramatic development in technical support capabilities over the last decade is the use of web sites to facilitate technical support. Web sites are already widely used to distribute software updates and, in a fraction of large organizations, they are used to make available client-searchable technical knowledge bases.

For sophisticated users particularly, this can be a very useful delivery mechanism. For less sophisticated users, the mechanism is less effective, because the diagnosis of a problem often requires a great deal of context which the user is unable to provide.

The web site approach to problem resolution has not proved itself financially attractive in many cases; the Association for Support Professionals has quoted a cost per web site support transaction at $28.12, which is not really cheaper than a telephone support transaction. Obviously, the point is that relatively few people are using such knowledge bases; they are unable to find what they need, or they simply prefer the telephone transaction; hence the costs of developing a site must be amortized over relatively few transactions.

Even for sophisticated users however, the fact that there are so many different 'experts' who could be providing information means that in general there are many web sites that might potentially need to be consulted in order to solve a problem. The result is an unreasonable search and communications burden.

Finally, even for distribution of updates, one can question whether web sites are really effective. By and large users do not know when an update is available and do not install it until told to do so by the tech support organization. If the user updates only because a phone call to technical support, the main cost of tech support – the phone call – has not been avoided or ameliorated.

2.3 Summary of Communications Obstacles

We could of course say more! In general, existing mechanisms of problem resolution suffer from the following shortcomings:

- *Excessive investment of time by Experts.* Experts with the knowledge to solve problems spend little of their time using their knowledge and most of their time attempting to communicate – i.e. to get from the user the information needed to diagnose and prescribe.
- *Excessive investment of time by Users.* Users trying to access expertise spend little of their time actually receiving expertise and most of their time attempting to communicate – i.e. to figure out the right support provider to help with a certain problem, to understand questions posed by technicians and get the answers to those questions, to relay to the technician the answers about their machine or (in existing automated approaches) to form search queries and sort through voluminous query responsae.
- *Excessive reliance on sophistication of users.* Existing approaches rely overwhelmingly on the ability of users to identify problems, to understand, to analyze, and to apply expertise.

At a higher level, we can criticize existing arrangements in three ways.

- *Passivity.* The existing approach to technical support is not pro-active: it waits for the user to have a problem and then to call the expert to obtain the fix. When there are known problems, affecting even a small fraction of a user base, we have a sadly predictable result: the problem is addressed only by waiting for literally thousands of phone calls from users and spending thousands of man-hours to connect experts with the users to fix the problem.
- *Ineffectiveness.* The existing approach is often ineffective, because it can't often obtain from typical users the information which would be necessary to diagnose the problem and obtain a solution.
- *Wastefulness.* After a potential problem and solution are identified, the problem continues to generate tech support demands, over and over, as new users experience the problem.

3 There is a Better Way

Universal Communications, Inc. has developed the ADVICENET system to facilitate the avoidance of, and speed the resolution of, a large fraction of typical computer support problems. Our customers, typically large organizations with large numbers of computers and users to support, will find our approach a very cost-effective way to increase the reliability and functionality of large numbers of computers, and to reduce the overall rate of escalation of support costs.

3.1 Technical Support in a New Key

Using our new approach, tech support will begin to exhibit these characteristics:

- *Problems are addressed pro-actively.* Experts who are aware of a potential situation and its solution can publish the information and have it widely available for use as needed.
- *Information is distributed automatically* via Internet, avoiding the cost and delay of physical distribution.
- *Automatic Diagnosis.* Wherever possible, the presence of problematic conditions will be made automatically, without intervention of either Expert or User.
- *Automatic Solutions.* Wherever possible, solutions are delivered automatically without the need for user intervention.

The whole process is much more effective for the support organization. Many calls to tech support are avoided altogether, and others are made drastically shorter. Expert involvement to communicate with the user simply to identify the user's situation prior to diagnosis of the problem is avoided. Expert intervention to make the diagnosis is minimized. Many 'small' problems affecting only a small fraction of a large organization's user base, but affecting collectively many tens of thousands of people, that previously consumed significant tech support efforts, can now be solved with very little effort on the part of tech support personnel.

ADVICENET allows an organization to adhere to the principle

Problems Get Addressed Just Once.

Once a problem has been identified and its solution is understood, the tech support provider can immediately publish the problem description and solution in a way which lead to the avoidance of further calls of a similar nature. There will no longer be a need to passively wait for potentially affected users to experience a problem and call tech support in order to get a solution.

The process will also work better for users:

- *Automatic Matching of Providers and Users.* The provider who knows how to solve the given situation is connected precisely with the user who is in that situation and needs the provider's help.
- *Automatic Diagnosis.* Wherever possible, the presence of problematic conditions is determined automatically, without intervention of the User.
- *Automatic Solution.* Wherever possible, the solution of problematic conditions is provided automatically upon User approval.

The new approach will avoid the need for sophistication on the user's part, and will also avoid the need for time-consuming involvement by the user, as well as the need for disciplined, routine efforts on the user's part. And it will work better than what he can get today – the user will routinely be receiving the *best* diagnosis that an expert organization has to offer, and the user will routinely be receiving a true automatic solution rather than a lengthy prescription for work by the user.

3.2 The ADVICENET System

Universe Communications, Inc. offers a package of tools and services which allow the Technical Support Organization (TSO) to provide pro-active, automated support. In broad over-view, there are the following components:

- *Advice Site.* The TSO offers an advice site, essentially a standard web-server connected to the Internet, at which ~~various~~ various documents are published.
- *Advice Documents.* These documents are descriptions of potential problems on PC's in a formal language – the ADVICENET RELEVANCE language – and descriptions of working solutions. They are developed and published by the TSO.
- *Advice Reader.* Members of the TSO user community, distributed across the internet, install the ADVICENET Advice Reader, and direct the reader to subscribe to the TSO's Advice site.

The ADVICENET system sets up a distribution channel whereby users automatically obtain information about potential problems they may be having. The channel makes the communication of potential solutions painless and efficient.

In broad terms the system works as follows.

- On a regular basis, perhaps daily, the Advice Reader automatically checks the TSO's Advice Site to see if any new advisories have appeared. If so, the Advice Reader downloads the new advisories, and installs them into the advice database.

- On a regular basis, perhaps hourly, the Advice reader literally reads the advisories in the advice database and compares them with the current state of the PC. If any of the advisories mention a condition which applies to the user at that moment, they are marked *Relevant*. This means they are applicable to the computer in question, and also of active and not just potential interest. The user is in a condition that the advice provider has determined ~~is problematic~~ merits attention.
- If there are any relevant advisories, the Advice Reader attempts to get the user's attention. The user, on opening the advice browser, will be presented with a list of relevant advisories and may inspect them one by one. This is analogous to the process of reading e-mail.
- An individual advisory will explain to the user the situation which has been identified, and will recommend an action to correct it. In most cases, there will be an 'OK button' which the user can push in order to initiate an automatic repair.

The system is easy to use – for all involved:

- The Advice Provider (TSO) need only author the Advice Documents and place them on the Advice Site. After that, these documents will be automatically diffused to all Advice Subscribers using standard Internet protocols. The process is Subscriber-driven – as Advice Readers on individual machines check-in to the site at random times, they obtain and read the new advice which has been published since the last visit.
- The Advice Subscriber does not need to do anything on a routine basis. He does not have to read advice documents or even be particularly able to understand technical issues associated with the computer. Instead, he simply ignores the existence of the ADVICENET system *until* ADVICENET *asks for attention*. At that point he reads the *advisory* being presented by the Advice Reader, which describes a potential problem and solution, and then 'clicks OK' to permit the solution.

The ADVICENET system directly addresses several 'hot-button' issues:

- The Advice Provider uses this system to minimize technical support costs. In particular, ADVICENET truly enables the TSO to deal with a problem just once; for after identifying a problem and solution, it can publish that information and automatically forestall future calls.
- The Advice Provider who uses the ADVICENET system wisely not need to worry about users becoming angry from receiving unsolicited information. Users are not asked to know about or review advice unless and until there is advice which is *Relevant* and *Timely* to the user.
- A user can be confident that the advice being shown to him was in fact authored by the source ~~they are~~ he is subscribing to (and presumably therefore trust). He is in this way protected from unsolicited advice of all kinds, in particular 'junk advice' or 'virus advice'.

3.3 AdviceNet Technology

The ADVICENET system probably sounds simple and efficient. In fact the simplicity derives from hard work! Universe Communications, Inc. has developed specialized technology in three different areas to make possible a simple and efficient solution.

- *Communications Protocols.* Currently, the Internet has three main branches: e-mail, World Wide Web, and Usenet. Viewed as communications protocols, these branches are distinguished by the type of communication – one-one, one-many, many-many – and the means of access. In essence, ADVICENET is a fourth branch of the Internet. It has similarities and essential differences from each of the other branches of the internet. The message format is similar to e-mail. The subscription mechanism is reminiscent of USENET. The site structure is reminiscent of WWW. Yet it is not identical to any of these. For example, Advice Providers do not 'mail' information to Advice Readers; and Advice Providers cannot in general expect that their advice will routinely be read by users; in fact it is expected that most advice on a user's machine will be irrelevant and will never be shown to the user.

- *Relevance Language and Engine.* At the center of the ADVICENET system is a formal language for determining the Relevance of messages to the current PC state. This language allows advice providers to specify quite precisely the situations under which a certain piece of advice will become relevant. The providers can use the language to specify that advice will be relevant only to certain manufacturer model numbers, only to certain versions of installed software, only under certain control panel settings, only under certain file attributes, and so on.

- *Inspectors.* The ability to describe the characteristics of a machine rests on the ADVICENET Inspector library, which allows the ADVICENET reader to inspect the machine for various attributes – versions and models of hardware and software, values of system settings, file attributes etc.

These three contributions represent a breakthrough in the conceptualization of support information. They provide a universal mechanism for automatically recognizing problematic situations and a universal mechanism for automatically providing solutions relevant just in those situations. For more information about the ADVICENET technology, see section 5.

3.4 How it works

In order to make the functioning of the ADVICENET system more concrete, we describe some typical applications. In order to make the reading more vivid, we take specific product names and true problem scenarios and describe how these problems would be solved if the organizations involved were using ADVICENET to solve their problems.

3.4.1 Aladdin and Netscape

Aladdin Systems is a maker of data compression products. It sells a premier data compression and archiving solution – Stuffit Deluxe 4.0 – to the Macintosh market. It also provides an OEM product – Aladdin Expander – that has a subset of the features of the deluxe product and which is installed by Netscape Navigator 3.

Here is a real problem situation. It turns out that when Netscape Navigator is installed *after* Stuffit Deluxe, the installer wipes out certain system settings in the process of setting

up Expander. As a result, Stuffit no longer works properly – many of its functions become disabled. Also, the user no longer has available the ability to automatically invoke the functionality of Stuffit Deluxe

On the other hand, for users who installed Stuffit Deluxe *after* Netscape 3.0, the problem does not occur.

Here is a real problem that Aladdin has faced: some, but not all, users of their premier product no longer have working products. Let's say that at the time of this problem, 75% of the Aladdin user base employed Stuffit Deluxe. Let's assume that half of those users installed Netscape before, and half installed Netscape after, the Stuffit Deluxe Application. So about three-eighths of Aladdin's users are affected by this situation.

Under current support regimes, Aladdin has these options

- A mailing to all registered users, costing a great deal and reaching only a fraction of the user population.
- Waiting for 1-800 phone calls from three-eighths of Aladdin's users; costing a great deal in support staff time and in phone charges.

Neither option is really effective or really efficient

Suppose instead that Aladdin had been able to employ ADVICENET as part of its technical support strategy. Then it could rely on the fact that upon installation of Stuffit Deluxe on a user's machine, an Advice Reader was installed and was subscribing to the Aladdin Advice Site. So Aladdin could simply publish an advisory describing precisely the combination of circumstances under which the problem will arise, and providing a solution, in the form of a simple AppleScript file to change various system settings. Minutes after the advisory was published, Advice Readers worldwide would begin to obtain copies of the new advisory. Those users who were directly affected would be notified of the situation and would be asked if they would like to fix it; upon approval, the fix would be provided.

The cost to Aladdin of this solution: training and keeping a programmer who understands how to author ADVICENET Advice Documents, and owning the basic Advice Provider tools. The savings, as compared to mailing or phone support? Highly significant.

3.4.2 Global Village and Eudora

Global Village is a manufacturer of Modems and other hardware, primarily for the Macintosh marketplace. In 1996 GV released a PCMCIA card for Macintosh Powerbook laptops called PowerPort Platinum, which combined a modem and ethernet card on a single PCMCIA card.

The original GV driver had a problem when the Ethernet card was used in conjunction with certain TCP/IP operations, which showed up as a failure of Qualcomm's e-mail program Eudora to finish transfers of attachment files.

The problem therefore generated calls to Eudora's tech support organization (rather than GV's), and after a while, both Qualcomm and GV were aware of the problem. The solution was rather simple, involving an update of the GV driver, and was made available by the GV web site and the Eudora Web Site. However, neither organization attempted to notify users of the problem and solution. Many users only found out about the problem and solution by speaking with tech support. The result was that the problem was never really solved; it has kept generating calls to tech support even up to the present time.

Suppose now that GV and/or Qualcomm had employed ADVICENET as part of their technical support strategies. Then they could rely on the fact that upon installation of either

the GV PC card driver or of Eudora, the Advice Reader was installed and was subscribing to the Advice Site of GV or Qualcomm. So GV could simply publish an advisory describing precisely the affected equipment – Apple Powerbooks with GV PowerPort Platinum 1.1.1 driver or earlier – and providing the solution, in the form of a simple script that would download and install a new driver. It could notify Qualcomm that this advisory was something that should be offered also to Eudora users, and Qualcomm would then in response, mirror the advisory at the Eudora Advice Site. Minutes after the advisory was published – by both Qualcomm and GV – Advice Readers worldwide would begin to obtain the new advisory, and PowerPort Platinum users everywhere would begin to be notified of the situation and would be asked if they would like to fix it; upon approval, the fix would be provided. Those users of Eudora – or of other GV products – who were not PowerPort Platinum customers would not be notified.

The cost to GV/Qualcomm of this solution: training a ~~programmer~~ who understands how to author ADVICENET Advice Documents, and acquiring the basic Advice Provider tools. The savings, as compared to servicing numerous user telephone inquiries? Highly significant.

3.4.3 Mindspring and PSINet

Mindspring is an Internet Service Provider which has grown dramatically over the last year. In 1997, Mindspring received a poor rating in certain service listings owing to poor connection rates at certain Points-of-Presence (POPs). Mindspring identified the problem as localized mainly to those POPs that were owned by PSI, a nationwide networking company. Mindspring developed its own alternative to those POPs but was faced with the problem of migrating its user community from the PSI POPs to the new Mindspring POPs. Despite repeated e-mails to the user population, it turned out to be difficult to get users to change the telephone numbers in their PPP settings.

The situation forced Mindspring to pay for having two POPs in many local areas – the new Mindspring POP, accessed by energetic and dutiful customers who had read and followed the Mindspring recommendations – and the old PSI POP, accessed by lazier souls. The solution which users were being asked to implement on their own was rather simple, involving simply typing in a new phone number in a certain control panel, and the approach was spelled out in the e-mail messages to all users. But the rate of user cooperation was well below 100%.

Suppose now that Mindspring had employed ADVICENET as part of its technical support strategy. Then it could rely on the fact that upon installation of the Mindspring service software, the Advice Reader was installed and was subscribing to the Advice Site of Mindspring. So Mindspring could simply publish an advisory describing precisely the combination of circumstances under which the problem would arise, *isolating exactly those user computers referencing a PSI POP* and providing a solution, in the form of a simple script to change the system settings as required. Minutes after the advisory was published by Mindspring, Advice Readers worldwide would begin to obtain the new document, and those users who were directly affected would be notified of the situation and would be asked if they would like to fix it; upon approval, the fix would be provided. Those Mindspring users who were not invoking PSI POPs would not be notified.

The cost to Mindspring of this solution: training and keeping a ~~programmer~~ who understands how to author ADVICENET Advice Documents, and owning the basic Advice Provider tools. The savings, as compared to continuing to pay PSI for use of PSI POPs?

Highly significant.

3.4.4 Novell and the Year 2000.

Novell is a large manufacturer of networking and network management software. In November of 1997, it was reported that Netware 3.12 had a year 2000 bug: after the rollover of the real date from 1999 to 2000, the Novell date would begin to show 1988. This turns out to be a complex problem to solve because a fraction of Novell's user base uses Netware 3.12; there is currently no convenient tool to identify and patch Netware 3.12 clients which are present in a large heterogeneous network including machines speaking other revisions of Netware and other protocols enirely.

Suppose now that Novell had employed ADVICENET as part of its technical support strategy. Then they could rely on the fact that upon installation of the original Netware software, the Advice Reader was installed and was subscribing to the Advice Site of Novell. So Novell could simply publish an advisory describing precisely the combination of circumstances under which the problem would arise, *isolating exactly those PC's using Netware 3.12* and providing a solution, in the form of a simple patch and installer scripts to change the software as required. Minutes after the advisory was published by Novell, those users who were directly affected would be notified of the situation and would be asked if they would like to fix it; upon approval, the fix would be provided. Those Netware users who were not running Netware 3.12 would not be notified.

The cost to Novell of this solution: training and keeping a programmer who understands how to author ADVICENET Advice Documents, and owning the basic Advice Provider tools. The savings for Novell as compared to answering many phone calls or using valuable account representative time exclusively for this purpose: Highly significant.

A variant of this would be available to very large organizations running Netware as part of their intranet. They would create their own advice site and set up their own PCs to subscribe to their corporate advice site. They could then mirror on the corporate site just those items from the Novell site which match corporate policy. Doing this, they would get all the benefit of Novell expertise, while controlling the impact of Novell-authored advice on their own assets.

The cost to the Corporate IT department of this solution: training and keeping a programmer who understands how to author ADVICENET Advice Documents, and owning the basic Advice Provider tools. The savings for Corporate IT as compared to identifying affected machines and manually upgrading each machine: Highly significant.

3.5 Compatibility with Knowledge-Base Tools

A key fact about ADVICENET is that it is complementary to existing automated technical support technologies. Rather than competing with existing knowledge-bases, it works with them, leveraging the investment in existing knowledge bases.

For example, large software companies like Microsoft are currently developing very large techincal knowledge bases, holding information about thousands of potential problems and methods of solution. Microsoft recently spent $500 million on developing its current technical support library and web site [7]. However, such a large investment in such resources has a limited payoff. The information must sit passively in server databases, until a tech support professional or a sophisticated user taps into the information to find the precise information of relevance to them.

ADVICENET allows TSO's, over time, to convert the information in their knowledge bases from passive to active information – mobile information which is in effect seeking out user PC's and pro-actively solving various problems on those PC's.

We advocate a 'Publish as you Go' approach to such conversion. Under this conversion scheme, whenever a support technician identifies and solves a user call-in problem using the knowledge base, the technician immediately publishes an advice document based on the given knowledge base document. (Authoring such documents is rather straightforward). The knowledge from the knowledge base is then in this way put to work actively avoiding future calls on the same issue.

'Publish as you go' is much more efficient than 'Convert Everything'. Rather than spending a lot of time publishing advice to prevent problems which are largely theoretical, the TSO is preventing the problems that actually are happening.

3.6 Compatibility with Relationship Management Tools

Once the TSO has adopted ADVICENET as part of its support process, it will obtain many side benefits. The organization will have in-house individuals with experience authoring ADVICENET documents, and the organization will be able to author documents which help in other phases of the customer relationship. We give a few examples:

- *Before the Sale.* The ADVICENET system can be used to automatically produce *Compatibility Checkers* from the TSO's advice database. These help users to verify that an intended purchase of software or hardware is compatible with an existing user system. This helps the TSO avoid costly expenses from tech support calls due to product incompatibilities or from outright returns.

  In order to gain this benefit the TSO has only to publish an advice digest at its web site which compiles all existing advice on compatibility issues in one large advice digest. The prospective user can download and presents to the Advice Reader in order to see what advisories would be generated upon installation of the new product.

- *Upon Installation.* The ADVICENET system may be used to automatically produce an *Initial System Profile* of a registered user. The profiler document surveys the user's configuration at registration time, and automatically (upon user approval) returns the information to the TSO. This allows the TSO's database to maintain a record describing the user configuration, which will lead to shorter tech support calls when they occur. Because ADVICENET in effect fills out the registration form automatically – at least as far as machine configuration information goes – the process is less burdensome on users and more informative to providers. Because users see the future use of ADVICENET as a benefit to them, they are more likely to cooperate with the registration process.

  In order to gain this additional benefit the TSO has only to include, as part of the installation process of its software product, a special advice document which upon installation queries the user's system to automatically learn about the user's configuration and then offer to return that information to the TSO. The user's privacy and security are respected; the user can see what information is being provided and only upon user aproval will the information be relayed back to the TSO.

- *Tech Support Event.* The ADVICENET system may be used to automatically produce an *Event-Driven Profile* in order to speed up technical support calls. This advice doc-

ument in effect surveys the user's configuration It automatically (upon user approval) returns the information to the TSO, and even, if desired, arranges for a technical support telephone call appointment. This allows the TSO to update its database records describing the user configuration, which will lead to a shorter tech support call, and allows the user, if desired, to schedule a call from tech support and so avoid waiting in line for a long time on a 1-800 phone line.

In order to gain this additional benefit the TSO has only to include, as part of the installation process of its software product, an advice document which is activated upon user request, queries the system to automatically learn information about the user's configuration and then offers to return that information to the TSO and to set up a telephone appointment. The user's privacy and security are again respected.

- *Upgrade/Update event.* The ADVICENET system may be used to announce the existence of updates and upgrades to a widespread user population. This allows the TSO to minimize the size of mailings which are customary today.

  In order to gain this additional benefit the TSO has only to author an advice document which describes the type of computer configuration for which the update is intended and and which links to the appropriate file. Then it simply publishes the document at the Advice site.

In short, the cultivation of an in-house advice authoring capability can pay off in many additional benefits beyond technical support: increased user satisfaction, increased participation in registration and updates, shortened tech support calls.

4 . The Future of Technical Support

As ADVICENET becomes integrated into the technical support industry, the world of technical support will change, both for users and providers. We'll give here a detailed sketch of how this may go.

4.1 The Independent User

Under the ADVICENET paradigm, the small business user will typically have installed on his computer a range of peripherals and of software applications. He will automatically be a subscriber to the advice sites of the manufacturers of these products. He will typically also be a subscriber to the advice sites of certain user groups and perhaps also to advice sites of certain systems integration consultants.

Of course, the advice sites of hardware and software manufacturers will contain announcements of updates to drivers and to installed software, and will also contain advisories about problems which could be experienced by users who have certain hardware and/or software applications installed, or who have certain system settings in their configuration files. The advice sites of systems integration consultants may contain custom advice, authored by the consultant, to better run the small business computer clients of his consulting practice. The advice sites of the user groups may contain diverse information – one can imagine information about interesting enhancements to major applications of interest to such users or about useful shareware.

In short, the typical consumer will have many one-one relationships with many different organizations, all managed and streamlined through the ADVICENET reader.

4.2 Relationship Management

ADVICENET provides a centralized, organized, unified and efficient way to mediate communications between providers and consumers.

Consumers will come to recognize many benefits of the ADVICENET system.

- *Quality.* The user will receive better service, will experience fewer problems, and will spend less of his own time in solving these problems. The user will understand the ADVICENET approach and will prefer it to traditional mechanisms because of its superior effectiveness and speed.
- *Simplicity.* There will be one well-understood user interface for communications of all kinds with providers of all kinds.
- *Ease.* There will be no need for the user or for the provider to do anything 'by hand' in order for the user to receive notices appropriate to his situation.
- *Freedom from Worry.* The user will have his security and privacy protected, and will understand the philosophy and the technology by which this happens.
- *Protection from Abuse.* The user will be protected from nuisance messages by ADVICENET , and will understand the philosophy and the technology by which this happens. The user will have natural, widely understood mechanisms to correct abusive situations.

In some sense, ADVICENET will become a way that the user can concretely visualize the technical support industry: it will be the user interface to that industry, and will teach users what to expect and what to obtain from tech support.

In turn, this will create new commercial opportunities as new businesses are formed around the use of this well-understood communications tool.

4.3 Support Industry Benefits

The support industry is in its infancy. While ideas like knowledge bases and trouble tickets are beginning to be standardized [6], there is in general no accepted set of tools for dealing with technical support problems in the computer industry.

ADVICENET changes that. It makes concrete these four major principles:

- Each Problem Gets Addressed Once and for All
- Problems get addressed pro-actively
- Problems get diagnosed automatically
- Problems get solved automatically

The ADVICENET system turns lofty ideals into practically acheivable daily operating facts. ADVICENET comes not a moment too soon.

> *Adhering to these principles is essential for the computer business to continue its current growth.*

The usual approaches for making computers work well have not been designed to cope with the explosively growing size of the number of computers and users, or with the increasing number of potentially problematic interactions. In fact, continuing current trends, the day is coming when there will not be enough 1-800 telephone staff, nor enough dealers and systems consultants, to deal even minimally with all the support problems that will arise.

However, ADVICENET goes beyond these four principles, and establishes new possibilities that had not been considered before

- *Precise field upgrades.* A small subset of a widely distributed user base can be updated or upgraded easily.
- *Precise problem feedback.* A two way channel can be set up, relaying information about the existence of unforeseen, serious problems back to the provider.
- *Increased registration rate with user base.* The provider can make it easier and more attractive to users to register, by automating the process and by cheaply provide benefits to users which will maintain contact.
- *Increased communications with user base.* The provider can stay in better contact with the user base, and canincrease the upgrade rate.

4.4 The Corporate User

A variety of possibilities exist for the use of ADVICENET in a corporate environment which we have not so far discussed. The corporate user will typically have installed on his computer a range of peripherals and of software applications. Depending on the corporate policy, there are two extreme cases. On the one hand, the computer might be configured much as an independent user's computer would be, with a range of subscriptions outside the intranet, some of them recommended by the corporate policy, others simply improvised by the user himself. At the other extreme, the computer might be permitted to subscribe only to advice at the corporate advice site. In the second scenario, the corporate site would be maintained by the IT department, which would review the advice being published by the producers of the software which had been adopted by the company, and would selectively re-publish advisories from those external organizations. In the second scenario – that of a rigorously controlled intranet environment – ADVICENET might typically be configured in a more 'automatic mode' and could be used to automatically run relevant advisories without user intervention, and to automatically report back information about corporate assets to the IT department without user intervention.

5 To Probe Further

This document gives only a broad overview of the ADVICENET system, focusing on the aspects which would be important to TSO's. There are several other documents published by Universal Communications, Inc. which should be consulted for more detailed information about the systems described here. Four of these documents could be read immediately after this document.

- THE ADVICENET SYSTEM. Describes the ADVICENET system for communicating active advisories to computers worldwide. Describes infunctional terms the key com-

ponents and protocols and points to other documents which contain further information.

- THE ADVICENET SITE DEVELOPER'S MANUAL. Describes the components of an advice site and how an advice provider can construct those components. Illustrates how an advice site can save an advice provider money in technical support and maintenance costs.
- THE ADVICENET RELEVANCE LANGUAGE. Describes the RELEVANCE language which allows the Advice provider to describe the machines to which a certain piece of advice will be relevant.
- THE ADVICENET INSPECTOR API. Describes how an advice provider can extend the RELEVANCE language to include capabilities directly addressing specific needs of the advice provider. Gives detailed information on the Applications Programming Interface and on the programming environment which is required to develop Inspectors.

This, and a list of all documents published by ADVICENET , can be obtained directly from Universe Communications, Inc.

References

[1] THE ADVICENET SYSTEM.

[2] THE ADVICENET SITE DEVELOPER'S MANUAL.

[3] THE ADVICENET INSPECTOR API.

[4] Comerford, Richard (1996) The battle for the desktop. *IEEE Spectrum* May 1997. pp. 21-

[5] 1997 Technical Support Cost Ratios Survey. Published by Association of Support Professionals.

[6] Law, Bruce (1996) A New Support Standards Initiative. Published by Association of Support Professionals. `http://www.asp.org`

[7] Tarter, Jeffrey (1996). Is there a payoff for service quality? Published by Association of Support Professionals. `http://www.asp.org`

EXHIBIT F

Outline for Meeting with Michael Glenn

1. Problem being addressed

Advice Provider:
- Organization or individual represented by server on an intranet or internet.
- Knows of conditions under which certain consumers would like to know something, potentially to act on it with approval.
- Potentially thousands or millions of conditions it can offer advice about.
- Potentially millions or billions of individuals it can offer advice to
- Most conditions depend on very special combination of circumstances at consumer end
  - Affect only a small fraction of consumer base, but large number of consumers
  - Description of condition might involve knowing a great deal of detailed information about the computer or contents of its storage devices
- This information might be considered very sensitive by consumers

Advice Consumer:
- Organization or individual on an intranet or extranet.
- Knows of Advice Providers offering advice of potential benefit to consumer.
- Typically does not want to review all the advice being offered by Advice Provider; only wants to see the subset of advice which is relevant and timely.
- Typically does not want to reveal information about his identity or detailed condition of his computer or contents of its storage devices to Advice Provider.
- Wants possibility of evaluating advice before adopting it.
- Wants possibility of adopting advice automatically.
- Can have relationship of this type with tens or thousands of Advice Providers.

AdviceNet System:
- Connecting AP with AC
  - automatically matching consumers with relevant advisories
- Preserving security, privacy,
  - no consumer need reveal identity nor attributes
    - no extra risk to consumer if advice not followed
- Offering relevance, timeliness, activity
  - advice typically only visible if relevant to consumer's situation
  - relevance determined automatically by AdviceNet system
  - relevance can include complex combination of
    - timeliness,
    - hardware attributes,
    - database attributes
    - personal attributes
    - randomization
    - remote attributes

Concrete Instance: Technical Support Industry
AP offers hardware, software, internet service, IT service
AP knows of problematic situations
AP knows precise description of situation preconditions
AP knows precise solution
AP packages information as advisory
AP offers by internet, using Advice Server
AC subscribes
AC has Advice Reader application
Advice Reader reads advisories, determines relevance
Reader reviews, approves, denies
On approval, automatic solution download/install/execute

There are many other concrete instances.

2. AdviceNet System Components

AP –	Advice Site	Internet URL-addressible directory plurality of files (advisories) directory message server http/ftp server
	advisories	typically specify precondition in formal language typically explain precondition in human language typically explain solution in human language typically offers internet access to solution to problem specially formatted ascii file easily transported over internet easily created/maintained
	site description file	describes an advice site basis for initiating subscription by consumer location (URL) frequency of synchronization type of relationship (free/fee)
	inspector libraries	Special purpose executable code Extends relevance language advice-site specific extension
AC –	advice reader	Application running on client machine Synchronizes with Advice Site Fetches advice files Unwraps advice messages Stores advice messages locally Interprets Relevance Displays Relevant messages to user Manages bodies of advice Manages subscriptions
	inspectors	Invoked by Advice Reader Can inspect properties of machine environment Inspect hardware, file system properties, data in files Allow Relevance decision to involve complex environmental properties.
	user profile	Special user-created file user-input data on preferences, requirements
	~~Wizards~~	support solution process Mr. FixIt Mr. Shell
	advice digests advice pools site profiles	

3. Transaction overview

Subscription model	Users become aware of existence of advice sites Users subscribe
Site Synchronization	Periodically or under user control Advice Reader queries advice site for directory message If directory changed, synchronizes contents Downloads advice from server to client Deletes moot advice on client
Downloading	Uses FTP/HTTP internet mechanism
Interpretation	Advisory: potentially complex hierarchical structure Reader unpacks the components of structure
Relevance Evaluation	Uses formal Relevance Language Parses Relevance Clauses Evaluates Clauses
Inspectors	Evaluate certain phrases in language Called by Advice Reader @ Relevance Evaluation Obtains system information File Properties System Settings File contents Hardware Properties User profile Remote File/System Properties Randomness
Digital Authentication	digital signature on advisory digital authentication of advisory contents
Display	List of relevant advisories Organizational and management tools
Action	User Offline action Download/install/execute Solution Script File for Wizard

4. Philosophical Overview

Automatic Unattended Operation
- infrequent user involvement
- periodic unattended synchronizations downloads
- constant unattended relevance evaluations

Privacy
- One-way nature of subscription interaction
- Customer need not reveal information -- name or preferences
- Information on client machine stays on the machine

Security
- Typically, no advice without subscription
- Subscription connotes partial trust
- Typically, no effects on system without prior notification and approval
- Security through trust
- Internet infrastructure allows retraction of one's own faulty advice
- Internet infrastructure allows criticism of other people's faulty advice

Decentralization
- any IP can be server -- no central registration
- any IP can be client -- no special registration

Extensibility
- anyone can extend the language to give it new capabilities

5. Internet Meta-Functions

Advice Reader typically subscribes to three privileged sites

`Advisories.com`
- Distribution of Advice Reader
- Distribution of Subscription Information

`BetterAdviceBureau.org`
- Issue advisories against bad advisories
- Issue warnings against bad advice sites
- Compile advice site complaints

`UrgentAdvice.net`
- Issue urgent advice

6. Advice File Format

Purpose	to package one or several advisories to offer one or several variants of same advice.
Basic Message:	Wrapper Subject Line Relevance Clause Message Body Action Button
Hierarchical	Advice file = digest of one or more messages Each component potentially relevance-guarded
MIME	Implementation of Wrapper Uses internet standards to package group of messages RFC 822 and successors
Message Body	HTML text both text and HTML
Authentication	Each component of message can be signed Each component of message can be authenticated Digital authentication -- MD5 or similar Digital signature -- PGP or similar

7. Relevance Language

Purpose	To specify precisely conditions under which a certain message would be relevant Ability to describe system state, including hardware, files, file contents, network and remote system states Ability to refer someday to objects in system and world not yet known/created
Characteristics	Descriptive Language English-like Object-Oriented, Strongly Typed Not a procedural language
Limitations	Despite visual resemblance, not like programming language No "`If`" "`While`" "`Case`" "`Goto`" "`Switch`" No traditional variables in language Computed arguments not allowed
Security	Evaluation must halt -- No infinite loops No ability to change -- no effects to file system
Extensibility Mechanism	Language can be expanded by adding inspector libraries Defines new data structures Defines new behaviors of those data structures

8. Inspector Libraries

Object-oriented structure	Specify object type
	Specify all allowed properties
	Specify outcome type of all allowed properties
Base library	Platform Specific
Extension libraries	Add new components dynamically
Functional Component	Need for extension
	Need for security
Intellectual Component	Soul of Machine

Special Inspectors

Registry Inspector	find any property of registry
Database Inspector	find any property of general SQL database
User Profile Inspector	find any property of user's profile
Remote Inspector	find any property of other machine in special trust relationship

9. Variations

Situational Advice
Alternate Transport mechanism
- Advice by e-mail
- Advice by drag and drop
- Advice by file reference

Open Bi-directional communications
- Questionnaires — e-mail back inspector values

Masked Bi-directional communications
- Anonymity
- Randomization

Charge Money (metering & cyber$$)
- to publish advice
- to subscribe
- to synchronize
- to download advice
- to download inspector
- to download solution
- to invoke solution

10. Spinoff Opportunities

Commodity Markets
Safety Warnings
Operational Advisories
Product recalls
Portfolio Management

11. Important System Components worth protection

R
Overall System
Advice Site
Better Advice Bureau Site
Urgent Advice Site
Advice Reader
Inspector libraries
Relevance Language
Document types
Optimizations
Registry Inspectors
Database Inspectors
Questionnaires
Randomized response
Remote Relevance Invocation
Wizards: Mr Shell, Mr. Fixit
Automatic advice generation: Naildown

12. Claims

About Relevance-Guarded Messaging

Ability for authors of broadcast messages to specify precisely the conditions under which a message would be of interest to consumer, by setting detailed conditions known only within user environment. Does not require breach of consumer privacy/security

About AdviceNet System

Automatically connect a population of consumers to *relevant* advisories.
Automatically furnish solutions to those consumers having relevant advisories.
Relevance based on detailed knowledge of information and resources at consumer's site or proxies.
System maintains privacy relationship: although it inspects sensitive information on consumer's site, the advice provider learns nothing about that site through the inspection process.

About Priveleged Advice Sites

`Advisories.com, BetterAdviceBureau.com, UrgentAdvice.com`
Mechanism to maintain integrity of an advisory system
Mechanism to identify released advisories and deprecate them

About Inspectors

Mechanism for authors to write in language which can remotely inspect properties of hardware, files, system settings, user profiles, file contents, database contents

Mechanism for authors to extend such language through provision of libraries dynamically extending language syntax, data structures, and semantics

Applications outside of AdviceNet System

About Registry/Database Inspector

Extension of AdviceNet mechanism to know properties recorded in any Microsoft Windows '95/'98 database
Extension of AdviceNet mechanism to know properties recorded in any standard SQL database.
Applications outside of AdviceNet System

About Remote Inspectors

Extension of AdviceNet mechanism to obtain information about user's environment to data repositories that may lie outside the user's jurisdiction/control. Allows to maintain privacy of distributed sensitive data.

Applications outside of AdviceNet System

About Questionnaires

Mechanism for Data Seeker to enlist consumer populations with special characteristics in data gathering, obtaining automatically detailed information about consumer's situation while offering full consumer control of what is being communicated back to Data Seeker.

About Randomized Response

Mechanism for Data Seeker to enlist consumer populations with special characteristics in data gathering, obtaining automatically detailed information about consumer's situation while actually obtaining no information about any individual consumer.

Remaining Questions:

Wizards
Optimizations
Commodities Markets
Financial Management

12. Claims

About Relevance-Guarded Messaging

Ability for authors of broadcast messages to specify precisely the conditions under which a message would be of interest to consumer, by setting detailed conditions known only within user environment. Does not require breach of consumer privacy/security

About AdviceNet System

Automatically connect a population of consumers to *relevant* advisories.
Automatically furnish solutions to those consumers having relevant advisories.
Relevance based on detailed knowledge of information and resources at consumer's site or proxies.
System maintains privacy relationship: although it inspects sensitive information on consumer's site, the advice provider learns nothing about that site through the inspection process

About Priveleged Advice Sites

`Advisories.com, BetterAdviceBureau.com, UrgentAdvice.com`
Mechanism to maintain integrity of an advisory system
Mechanism to identify released advisories and deprecate them

About Inspectors

Mechanism for authors to write in language which can remotely inspect properties of hardware, files, system settings, user profiles, file contents, database contents

Mechanism for authors to extend such language through provision of libraries dynamically extending language syntax, data structures, and semantics

Applications outside of AdviceNet System

About Registry/Database Inspector

Extension of AdviceNet mechanism to know properties recorded in any Microsoft Windows '95/'98 database
Extension of AdviceNet mechanism to know properties recorded in any standard SQL database.
Applications outside of AdviceNet System

About Remote Inspectors

Extension of AdviceNet mechanism to obtain information about user's environment to data repositories that may lie outside the user's jurisdiction/control. Allows to maintain privacy of distributed sensitive data.

Applications outside of AdviceNet System

About Questionnaires

Mechanism for Data Seeker to enlist consumer populations with special characteristics in data gathering, obtaining automatically detailed information about consumer's situation while offering full consumer control of what is being communicated back to Data Seeker.

About Randomized Response

Mechanism for Data Seeker to enlist consumer populations with special characteristics in data gathering, obtaining automatically detailed information about consumer's situation while actually obtaining no information about any individual consumer.

Remaining Questions:

Wizards
Optimizations
Commodities Markets
Financial Management